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ABSTRACT

This work addresses itself to improving the process of teacher selection by providing more information about teaching ability. The study reported was undertaken to determine the effects of incorporating into the educational placement credentials a set of materials relating to a science teacher's classroom performance. In the report, past research is examined for clues to credential usefulness and improvement. A detailed description of the new credential is provided, as well as the results of an evaluative study to determine its effectiveness. Economical, technical, legal, and ethical issues relating to the new credential were examined in the study but not reported in this paper. Related research is presented showing various types of selection processes and how unrelated most are to actual teaching performance. To determine the usefulness and effectiveness of each part of the credential package, seven separate prototype credentials were developed. Examples are presented as well as a description of the evaluation process. (Author/EB)

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A New Dimension in Selecting Science Teachers*

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Selection of teachers is a fascinating subject, well worth the coverage it receives. This present work addresses itself, toward improving the selection process, by providing more information about teaching ability. Educational recruiters have often complained that placement credentials provide little information about a candidate's ability to teach. This study was undertaken to determine the effects of incorporating into the educational placement credentials a set of materials relating to a science teacher's classroom performance.

In this report, past research is examined for clues to credential usefulness and improvement. A detailed description of the new credential is provided as well as the results of an evaluative study to determine its effectiveness. Economical, technical, legal, and ethical issues relating to the new credential were also examined but are not reported here.

Related Research

Much has been written for potential employers on how to select teachers. Unfortunately most of it is based on opinion, while little research has been conducted. This review will draw from research which, in the author's opinion, has a bearing on development of a placement credential better representing a candidate's "ability to teach".

Gilbert (1966), after completing a national survey of teacher selection processes in large public school systems, was dismayed at those used. He concluded that selection methods focused exclusively on the overt and peripheral aspects of teachers, and appeared to be governed by what was most easily obtained rather than on what might be important to assess.

Selection methods have a direct effect on final decisions, and Scott (1964) has polarized the methods used. A clinical method, he notes assumes both job and teacher are too complex for investigation and that different teaching approaches lead to comparable end results. In contrast, an actuarial method assumes predictors of teaching success exist and should be used.

In an earlier work Toops (1945) noted five selection methods which could be considered actuarial in nature. First, a summation of characteristic scores organizes bits of information into categories which are 'summed' by some process. In a second method, successive hurdles, items with high validity are applied until the desired number of candidates is reached. Identification of certain characteristics deemed essential for the job is a third method and results in a precise profile of candidates. Fourth, an off-shoot of this method results in the establishment of an ideal profile; a candidate who diverges least from the ideal is rated the most desirable. Finally, the outstanding merit method gives the most weight to candidates who possess outstanding qualifications in more than one characteristic.

Rather than describe methods of selection, some writers have identified discreet steps within methods. Based on an extensive research study, Bolton (1970) suggests seven stages in the selection process. One step, gathering data about candidates, has implications for developing placement credentials. Bolton makes several recommendations: 1) avoiding letters of recommendation as accurate appraisals of character or potential worth; 2) systematically assessing teaching performance; 3) seeking information from a variety of sources; 4) seeking information regarding the conditions under which a reference has observed the candidate; 5) using a single summary document.

Reviewing steps in the selection process Bauthues (1968) notes that most interviews and reference letters are unreliable and invalid, and recommends a standard form for both in order to increase reliability. He also recommends that predictive validity studies be conducted in each school district in order to establish better selection criteria. Medley (1967), Redfern (1967), Majetic (1972), Masonis (1972), and Mitzel (1967), all suggest similar validity studies.

There are a variety of selection methods and all gather data about candidates More research must be done to establish reliable and valid selection criteria. Specifically more reliable and standardized letters of reference could aid in the selection process. Since letters of reference are only one aspect of most placement credentials, what other items should be added to, or deleted from, a placement credential? Very few surveys, published in the literature, have been conducted to determine item usefulness.

Paquette (1966) surveyed employers and college placement personnel to determine what should be included in a credential, of what value the credential was, and what factors were important in the selection process. It should be noted that this study was concerned with placement credentials for business and industry. His findings indicated that employers and college personnel agreed that personal data, educational history, and work experience should be included in a credential. The agreement between the two groups differed significantly in the area of letters of reference. College personnel believed faculty and employer references were quite important ranking them, respectively, fourth and fifth in what should be included, while employers ranked these same items sixth and twelfth. Employers ranked a recruiter's report as the most important factor in the selection process, while student credentials were ranked fourth, faculty references fifth, and past employers' references eighth. Based on his findings, Paquette, too, recommended that personal references be eliminated from the credential.

Dropkin and Castiglione (1969) studied the usefulness of items in teacher placement credentials. Using a 42 item questionaire they sought to determine items considered indispensible by personnel recruiters; if a relationship existed between school district size and item usefulness; and if a relationship existed between usefulness of an item and the difficulty

in obtaining teachers. In their report the items considered indispensible for inexperienced teachers were letters of reference from cooperating teachers and supervisors, location and type of student teaching, undergraduate transcript, and graduate courses with grades. These results coupled with similar findings for experienced teachers led them to suggest that items ranking highest in importance were concerned with the candidate's most recent observed teaching behavior, while items ranking lowest in importance dealt with the candidate's character. Dropkin and Castiglione also concluded that rated items of importance had a negligible relationship to school district size and difficulty in obtaining teachers. An inference from this information could be that any addition to a placement credential should be more directly related to the candidate's teaching performance.

One research study, not directly related to placement credentials, but which has implications for developing useful credentials, was that done by Bolton (1968). His study investigated the effects of four variables on the selection process; instructions on how to process information, number of documents describing the candidate, masking of selected information, and interview information. The dependent variables used were the total time taken to process the information and how well, how certain, and consistently a group could distinguish between candidates. Teacher selection materials developed included written documents such as transcripts, credentials, etc.; audio and audio visual materials for simulating teacher interview situations; and job descriptions. These materials were given to 144 school principals who were to select fictitious candidates for the jobs. Optimum results as far as time, discrimination, consistency and degree of certainty occurred when principals were given instructions on how to process the information; when a single summary document was used; when no information regarding the candidate was masked; and when interviews included visual as well as audio stimuli.

Bolton's study appears to be the first to use a filmed interview with a candidate. Although he used it to standardize an interview in a controlled experiment, others have utilized the idea as a placement function. The University of Maine video tapes an unrehearsed, unedited conversation between the candidate and an interviewer. This 15 minute video tape along with a personal resume is sent to an employer so that a decision about further negotiations can be made. Lang (1970) makes available to prospective employers a 5-10 minute segment of a teacher candidate's classroom performance. He believes that selected editing of the video tape is permissible since the resume is naturally favorable to the candidate. He notes that recruiters who have used the video tapes liked them very much. The University of New Mexico Placement Bureau (1971) dubs several 2-3 minute segments on one video tape of several candidates for the same teaching position. This is done at the request of a recruiter who describes to the placement director the type of position he has available. The resulting tape presents all of the available candidates on a single half-hour tape. To date the writer has found no published research on the effect or usefulness of a filmed/video taped teaching performance.

Summary

The literature review has shown various types of selection processes and how unrelated most are to actual teaching performance. It is clear there is a need for reliable and valid information suitable for predicting job success. Descriptive materials which are standardized, provide comparable data and are related to a job description appear to be most useful in the selection process. A visual representation of the candidate in interview of job simulation is a potential, but unresearched resource for placement purposes. Presumably any addition to or change in a placement credential should be guided by this information.

Development of the Credential

The initial effort to improve the placement credential was directed toward the letter of reference. The previous section has shown that several researchers recommend its elimination and/or standardization. Anyone who has written or read such letters can infer the reasons why. It is difficult to communicate in a few short paragraphs a candidate's teaching ability. Many reference writers describe moral or personal characteristics believing these to be indicative of good teaching; others describe courses taken by the candidate and grades received; in either case little of the candidate's teaching ability is presented. Researchers (Bolton 1970) (Bauthues 1968) have recommended a standard form which would increase reliability and make comparisons possible.

At the end of the practicum experience, science cooperating teachers for the UW-MSN are given a form which develops a profile for the candidate in six areas: subject matter mastery, planning, teaching ability, classroom climate, evaluation and personal characteristics. These six areas were made the basis for writing the author's letters of reference. Under each heading a brief description of the candidate's abilities in that area was provided. Prefacing each letter was a brief description of the setting in which the candidate was observed. Ending each letter was a prediction of the candidate's success, based on the observations made in the six areas. In the appendix is an example of the reference letter. This type of reference letter was thought to provide the reader with a frame of reference, some subjective information about the candidate's ability as a teacher, and a prediction of success. 'Standardizing' the letter for candidates, i.e., comparing the candidates in the same six areas, would make comparisons possible.

The next addition to the placement credential was a list describing the objectives achieved while in the methods course and practicum experience. Since the science methods course and practicum experience is based on 64 objectives directly related to science teaching, many of them being based on classroom performance, it was thought that such a list would provide more information about the candidate's teaching ability. A summary sheet, found in the appendix, was developed describing how

candidates achieve objectives, what the emphasis for each objective was, and how well the objective was achieved. Objectives achieved in the methods course are evaluated by the methods professor, while those completed in the practicum are evaluated by the cooperating teacher.

Because most of the objectives attained by each candidate are elected, the summary sheet described above does not provide a comprehensive description of the candidate's teaching ability. A supplementary source was provided in the form of a 'pictograph' obtained from the rating form, completed by the cooperating teacher; and described above (See Appendix). This pictograph shows how the rater believes the candidate compares to other beginning teachers and to himself in six areas -- subject matter, mastery, planning, teaching ability, classroom climate, evaluation and personal characteristics. Two pictographs were provided, one completed by the cooperating teacher who has observed in depth several (1-15) candidates, and one completed by the science methods professor/student teacher supervisor who has observed many (300) candidates. These pictographs, in essence, are a single summary document making possible comparisons between the candidate and other beginning teachers whom the rater has observed.

The final addition to the placement credential was the addition of a 15-25 minute sample of the candidate's teaching on a video tape. This sample was selected from 1 to 2 hours of video tape made during the candidate's last two weeks in the practicum experience. A sincere effort was made to show the candidate in several different teaching situations -- discussing, lecturing, and tutoring. These teaching sequences were taken by a university supervisor and those portions appearing in the placement credential were selected by him. The final product was recorded on a three-quarter inch video cassette and opened with a visual describing the candidate's educational background, where he student-taught, and how the teaching sequences were gathered. All visuals refrained from making evaluative statements about the candidate or in any way directing the viewer to note specific highlights. Enclosed with each video cassette was a card briefly describing the teaching sequences and where to find them on the tape.

To summarize: based on research findings, additions and changes were made in the educational placement credentials of beginning science teachers. These included a more standardized letter of reference; a summary sheet describing the objectives achieved by the candidate during the methods course and practicum experience; a pictograph; and a short video taped teaching sequence made during the candidate's last weeks in the practicum.

Evaluation of the Credential

To determine the usefulness and effectiveness of each part of the credential package, seven separate prototype credentials were developed (See Table I). Administrators and science supervisors throughout the State

of Wisconsin, involved in hiring new teachers, were invited to participate in the evaluation process. Of those who were invited, 32 were free on the evaluation days and actually participated. Six of the participants were science teachers or science department heads, seven were personnel directors, six were principals, six were assistant superintendents, and the remaining seven had various titles such as Coordinator of Personnel, Director of Operations, Coordinator of Secondary Education. Participants were given tasks designed to provide answers to four questions:

1. What effect does the credential type have on a candidate's ranking for employment?

2. Which information in the prototypic credentials is most useful in ranking candidates for employment?

3. Which prototypic credential provides the most confidence in candidate ranking?

4. What do potential employers look for in a video taped teaching sequence?

The evaluation tasks designed to obtain data on each question are shown in the appendix.

Table I

Seven Prototypic Credentials Used in This Study.

1. Written Materials
   a. Candidates personal data, career objectives, avocations, etc.
   b. Course titles and grades
   c. Letter of reference from cooperating teacher
   d. Letter of reference from university supervisor
   e. Letter of reference from methods professor
2. Objectives Materials
   a. Objectives for methods course and practicum experience.
   b. Pictogram which summarizes candidates performance in seven areas and is compared with other beginning teachers.
3. Video taped teaching sequence.
   a. Discussion session
   b. Lecture session
   c. Laboratory session
4. Written material and Objective material
5. Written material and Video taped teaching sequence.
6. Objective material and Video taped teaching sequence.
7. Written and Objective Material and Video taped teaching sequence.

Question One

What effect does the credential type have on a candidate's ranking for employment?

Hypothesis

Each of the prototypic credentials can be conceptualized as providing information regarding teaching ability. Further, some of the credentials are more representative of teaching performance than others; i.e., some actually display a teaching performance. From this perspective, the written material is least representative of actual teaching performance. The objective material is more representative of actual performance since it represents the teaching skills a candidate has acquired and how well he has developed them. Finally, the video taped teaching sequences are most representative of performance since they actually show the candidate in action. Assigning a rank of one to the least representative credential and a three to the most representative, a ranking in terms of representation of performance can be obtained. (See Table 2)

Table 2

Predicted Rank of Credential Type in Terms of Teaching Performance Representation

Type		Predicted level of Representation (1 low 6 high)
Written (W)		1
Objectives (O)		2
Video Tape (V)		3
WO	1+2	3
WV	1+3	4
OV	2+3	5
WOV	1+2+3	6

From Table 2 it was inferred that as one proceeded down the list, the credentials became more representative of teaching performance.

Two hypotheses were developed: First, as the credentials became more representative of teaching performance, participants would agree more closely in ranking the candidates for desirability in employment. Second, as more information about the candidate's teaching ability was provided, the ranking assigned by a group having the same prototypic credential would agree more closely with the ranking assigned by individuals who had actually seen the candidates teach, i.e., university supervisors. If this latter hypothesis were not true, then 1) the prototypic credential was not representative of actual teaching performance, or 2) the

participants' conception of what good teaching was would be different from that held by the individuals who actually saw the candidates teach. This latter alternative was explored in answering question four.

Method

Prototypic credentials were prepared for eight candidates, four in biology and four in chemistry. Seven groups of four participants each were given the same type of credential. Participants were asked to rank from most to least desirable the four candidates within a subject matter area, using only the material provided. Each group ranked the applicants in both subject matter areas but using different types of prototypic credentials.

To test the first hypothesis, Kendall's coefficient of concordance was computed for each group to estimate how closely the four participants agreed in assigning ranks. These coefficients of concordance were then ranked from least in agreement (lowest in magnitude) to most in agreement (highest in magnitude), and compared to the predicted ranking, using Spearman's rank correlation coefficient. If a rank correlation coefficient differed significantly from zero at the .05 level, the prediction was considered supported.

To test the second hypothesis, Kendall's coefficient of concordance was used to determine the agreement within a group, between the participants average ranking and the rankings assigned by persons who had actually seen the candidates teach. The coefficients were ranked and compared to the predicted ranking, using Spearman's rank order correlation coefficient.

Results and Discussion

The data to test the first hypothesis are presented in Tables 3 and 4. Inspection of these tables shows more apparent agreement in ranking the chemistry candidates than for the biology candidates. From the computation of the correlation coefficient it appears that there is no relationship between a credential's representation of teaching ability and agreement in ranking the candidates for desirability in employment. One could easily conclude that the hypothesis was not supported by the data; however, a competing explanation is apparent from examining the directions given to participants who were asked to consider the candidates as applicants for positions in the participants own school. Since a wide variety of school systems were represented in the evaluation program, it is possible that no agreement could be reached. In order to control this, the directions should have given the same job description to all participants. Feedback from participants during a debriefing session conducted after the evaluation session supported this point of view. Because of this the original hypothesis needs to be tested under more rigorous conditions before any conclusions regarding representativeness of teaching can be reached.

Table 3

Judge's Ranking of Biology Candidates and Group Coefficients of Concordance

Prototypic Credential	Judge	Candidates	Assigned Rank for Employment Purposes			Coefficient of Concordance (W)	Rank of (W)	Predicted Rank of (W)
		a	b	c	d			
Written (W)	a	4	3	2	1	.08	1.5	1
	b	2	3	1	4			
	c	1	3	4	2			
	d	3	2	1	4			
Objectives (O)	e	2	3	1	4	.68*	6.0	2
	f	2	3	1	4			
	g	4	3	1	2			
	h	3	2	1	4			
Video Tape (V)	i	2	3	4	1	.32	3.5	3.5
	j	3	1	2	4			
	k	1	2	3	4			
	l	1	2	3	4			
WO	m	3	2	1	4	.32	3.5	3.5
	n	3	2	1	4			
	o	3	4	1	2			
	p	4	2	3	1			
WV	q	3	4	1	2	.70*	7	5
	r	3	2	1	4			
	s	2	3	1	4			
	t	2	3	1	4			
OV	u	2	4	1	3	.38	5	6
	v	3	4	1	2			
	w	2	3	1	4			
	x	1	3	4	2			
WOV	y	4	3	2	1	.08	1.5	7
	z	1	4	2	3			
	aa	2	1	4	3			
	bb	3	4	1	2			

correlation between predicted rank and actual rank .09

*Significantly different from zero at .05 level.

Table 4

Judge's Ranking of Chemistry Candidates and Group Coefficients of Concordance

Prototypic Credential	Judge	Candidates	Assigned Rank for Employment Purposes			Coefficient of Concordance (W)	Rank of (W)	Predicted Rank of (W)
		a	b	c	d			
Written (W)	a	4	1	3	2	.83**	6	1
	b	4	1.5	3	1.5			
	c	3	2	4	1			
	d	4	2	3	1			
Objectives (O)	e	3	2	4	1	1.0**	7	2
	f	3	2	4	1			
	g	3	2	4	1			
	h	3	2	4	1			
Video Tape (V)	i	3	2	4	1	.55	3.5	3.5
	j	2	3.5	3.5	1			
	k	1	2	4	3			
	l	1	2	4	3			
WO	m	3	2	4	1	.55	3.5	3.5
	n	4	1	3	2			
	o	4	3	1	2			
	p	4	1	3	2			
WV	q	3	1	4	2	.54	1.5	5
	r	3	2	4	1			
	s	3	1	4	2			
	t	3	1	4	2			
OV	u	2	3	4	1	.70*	5	6
	v	2	1	4	3			
	w	3	2	4	1			
	x	3	2	4	1			
WOV	y	3	1	4	2	.54	1.5	7
	z	4	2	3	1			
	aa	4	1	2	3			
	bb	4	2	1	3			

Correlation between predicted rank and actual rank -.68

* Significantly different from zero at .05 level

** Significantly different from zero at .01 level

Tables 5 and 6 present the data gathered to test the second hypothesis. Computation of the correlation coefficient as not significantly different from zero does not support the hypothesis that as more information about the candidate's teaching ability is provided, average rankings assigned to the candidates would agree more with the rankings assigned by university supervisors who had observed all candidates teach. The results could be explained by competing hypotheses: as for the first hypothesis each participant was ranking the candidate for his own school; participants were using a different standard for judging who was the best teacher; or the prototypic credentials are not representative of teaching performance. An additional hypothesis was supplied by more than half of the participants who noted that their ranking of the candidates changed depending on whether the video tape was observed before the written materials or vice versa. These participants obtained one ranking based on the written materials and then had to rerank candidates after viewing the video tapes. This suggests that order of presentation may be important. A graphical picture of how a candidate's rank changes with the information presented is shown in Table 6.

To review: Neither hypothesis was supported by the data, but an error in the directions to participants could explain the results. In view of this, judgments regarding the credentials representation of teaching ability will be withheld until the hypotheses are tested under more controlled conditions.

Question Two

Which information in the prototypic credentials was most useful in ranking candidates for employment?

Hypothesis

Past research on credential usefulness has shown that letters written by individuals who have actually observed the candidate teach, rank quite high (Dropkin and Castiglione, 1969; Paquette, 1966). The cooperating teacher's letter of recommendation is usually ranked number one in terms of usefulness. Dropkin and Castiglione inferred from their survey that items receiving the highest ranking are concerned with the candidates most recent observed teaching behavior. From this it was predicted that those items in the prototypic credentials which directly relate to the candidates' teaching performance would rank highest. These would be the video taped teaching sequences and the letters of reference from cooperating teachers and university supervisors. Those items which would rank lowest according to Dropkin and Castiglione would be those which relate to the candidates' personal characteristics. In the prototypic credentials these items are candidate's personal data sheet. The predicted ranking of usefulness is given in Table 7.

Coefficient of Concordance computed between a candidate's average ranking within a credential type and the average ranking assigned to candidates by persons who observed all candidates.

Prototypic Credential	Biology Candidates		Chemistry Candidates	
W	.62	(3.5)*	.90	(5)
O	.62	(3.5)	1.00	(6.5)
V	.10	(1)	.70	(1)
WO	.90	(7)	.82	(3.5)
WV	.60	(2)	.82	(3.5)
OV	.70	(5)	1.00	(6.5)
WOV	.82	(6)	.80	(2)
Correlation coefficient between actual rank and predicted rank.	.42		-.21	

*Numbers in parenthesis indicate rank of concordance coefficient

Table 6

Line graph showing candidates average ranking within a credential type as a function of credential type

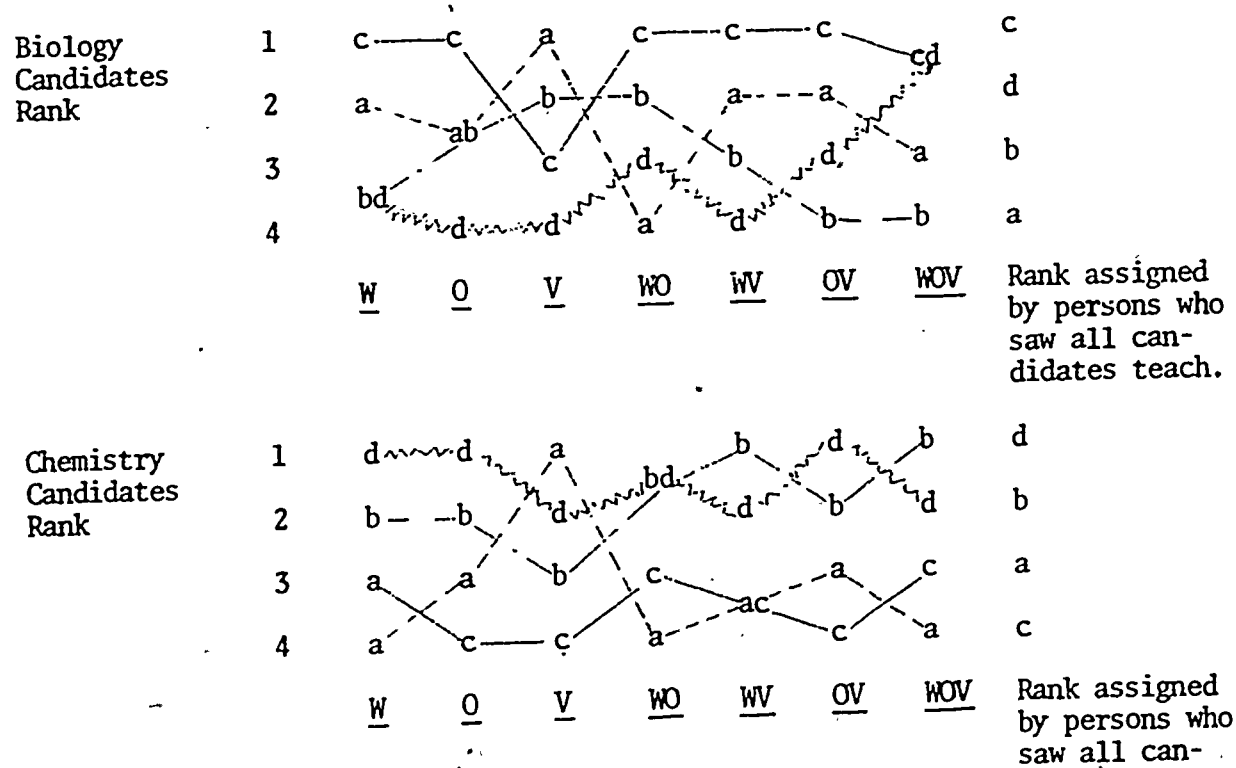

Table 7

Predicted Ranking of Credential Item Usefulness

Rank	
2	Video taped lecture sequence
2	Video taped discussion sequence
2	Video taped tutoring sequence
5	Letter of reference from cooperating teacher
5	Letter of reference from university supervisor
5	Letter of reference from methods professor
7.5	Objective list
7.5	Pictograph
9	Grade report
10	Candidate's personal data

Method

After having ranked candidates from most desirable to least desirable, using a particular prototypic credential, participants were asked to rank the usefulness of the material supplied. Participants were also asked if any item provided was particularly helpful in ranking the candidates. If no item was particularly helpful, administrators were asked to indicate what type of information should have been supplied.

For each item in a prototypic credential a score was computed from the assigned ranks. That item having the lowest total score was ranked one. The item having the next largest score was ranked second. This procedure was followed for the items used to rank biology candidates as well as those used for the chemistry candidates. Rankings of usefulness for the biology and chemistry candidates were compared, using Spearman's rank order correlation coefficient. A significant correlation at the .05 level was accepted as evidence of participant agreement of item usefulness. An overall ranking of item usefulness was obtained by converting all average rankings within a credential type to a scale of 10 and then within an item finding the median score. The median for each item was then ranked -- the lowest median being given the rank of 1 and designated as most useful, etc.

Results and Discussion

Average rank of item usefulness is displayed in Table 8. The significant correlation between groups of raters ranking item usefulness and using the same type of credential should be pointed out. The correlation between predicted item usefulness and item usefulness as perceived by the participants is .78 and significantly different from zero at the .01 level, thereby supporting the hypothesis. During debriefing sessions participants remarked that the objective list and pictograph were difficult to use because they did not understand their purpose. After providing information relating to their development, participants thought such items should be included with a better explanation of their purpose.

Table 8

Average Rankings of Item Usefulness Within Credential Type and Candidate Group

Credential Type	W		O		V		WO		WV		OV		WOV		Overall Rank of Usefulness
Candidate Group	Bio	Chm	Bio	Chm	Bio	Chm	Bio	Chm	Bio	Chm	Bio	Chm	Bio	Chm	
Credential Item															
Candidate's Personal data	5	5					6.5	7	6	5			6	8	9
Grade Report	3	3.5					2	5.5	8	8			9	4	8
C.T. Letter of Recommendation	1	1					1	1	2	2.5			1	5	2
M.P. Letter of Recommendation	4	3.5					3.5	4	5	6.5			7	2	6
U.S. Le-ter of Recommendation	2	2					5	2	7	6.5			4	6	3
Objective List			1.5	2			6.5	5.5			5	5	10	10	10
Pictograph			1.5	1			3.5	3			4	4	8	9	7
Lecture-Video Tape					3	3			4	4	3	3	3	3	5
Laboratory-Video Tape					2	2			3	2.5	1.5	2	5	7	4
Discussion-Video Tape					1	1			1	1	1.5	1	2	1	1
Rater Agreement (Concordance Coef.)	.77**	.55**	t	t	t	t	.21	.25	.37*	.49*	.77**	.91*	.57**	.17	
Correlation between two rankings (Spearman's rank correlation)	.98*		t		t		.77*		.95**		.98*		.94**		

t not possible to determine because of small sample size
* significant at .05 level
** significant at .01 level

The data support the conclusion that the video taped teaching sequences are a valuable aid in the selection process, and that the objective summary sheet and pictograph will be if more information regarding their value is supplied.

Question Three

Which prototypic credential provides the most confidence in candidate ranking?

Hypothesis

As more information about the candidate's teaching performance is made available to prospective employers, it was hypothesized that the confidence in ranking candidates from most desirable to least desirable would be increased. Referring to Table 1 this means that proceeding down the list of prototypic credentials, the confidence in ranking candidates will increase.

Method

After obtaining a final candidate ranking, participants were asked to indicate on a 1 (not confident) to 5 (very confident) scale their confidence in the final rankings. For each prototypic credential group the average confidence rating was found and then ranked. This ranking was compared to that predicted using Spearman's rank order correlation coefficient.

Results and Discussion

Average confidence ratings for each credential type appear in Table 9. Correlations between the predicted ranks and actual ranks are high and significantly different from zero, thus supporting the hypothesis that as more information about the candidate's teaching performance is provided, confidence in choosing the 'right' candidate is increased.

Question Four

What do potential employers look for in a video tape teaching sequence?

Hypothesis

In the science education area supervisory personnel are instructed to help beginning teachers by observing classroom teaching behaviors such as: planning for and obtaining student involvement; questioning and reacting techniques; presentation of abstract concepts using visual aids. Experience and some research has shown that beginning teachers who have few problems in these areas usually have successful practicum experiences. Teaching situations were sought for inclusion in the video taped placement credential to illustrate a candidate's ability in these areas. One important question, however, was: Do potential employers consider these same areas as important when viewing a candidate, or are other classroom behaviors noted? No prediction could be made regarding the answer to this question since little has been written on the subject.

Table 9

Average confidence rating in final candidate ranking as a function of credential type

	Confidence in Overall Ranking			
	Biology		Chemistry	
Credential Type	Average Rating	Rank	Average Rating	Rank
W	2.4	2	3.4	3
O	1.7	1	2.8	1
V	3.5	3.5	3.2	2
WO	3.5	3.5	3.7	4
WV	3.7	5	4.2	6.5
OV	3.9	6	4.1	5
WOV	4.1	7	4.2	6.5
Correlation between predicted rank and actual rank		.95**		.81*
Correlation between the two rankings			.82*	

* Significant at .05 level
** Significant at .01 level

Method

The video portion of three different credentials were presented to six participants. The candidates represented by the video tapes were not the same as those used previously. All candidates used in this part of the study were considered to be excellent teachers by the university supervisors.

One candidate was shown in an inner city middle school setting where students manifested much energy in movement and noise. One candidate, casually dressed was shown in a suburban high school setting teaching biology to enthusiastic students. The third candidate was shown in a small group teaching situation neatly dressed in blue jeans and work shirt wearing long hair and beard. These video tapes were used because it was thought that the factors described above would detract observers from the overall teaching performance.

Each participant viewed the video tape alone in a room without distractions. Each participant was given a dictaphone and asked to think out loud while viewing. The recorded statements were transcribed and individual statements categorized.

Results and Discussion

Presentation of the data gathered is difficult owing to its nature. However, five general areas were identified into which the comments could be placed and are presented along with representative sample comments. About fifty percent of the comments concerned teaching behaviors: "Repeats student answers," "Good use of blackboard," "Probing questions," "Keeps students interested," "Admitted he didn't know," "Tried to get students actively involved." Approximately ten percent of the comments concerned personal appearance: "The conservative element of any community would question his appearance," "Doesn't dress as well as most teachers, but maybe that is not important." It should be noted that for one participant fifty percent of his brief comments were directed toward the candidate's appearance and seemed to influence later comments negatively. (The candidate was only commended for his probing questions by the viewer.)

Roughly twenty percent of the comments were made about the students: "Students asked the teacher a question," "Students are enthusiastic," "Students are engrossed in their work," "Background noise is high, but teacher has things under control." Five percent of participants' comments presented the viewers frame of reference. Only one participant did this since he recently entered educational administration from an industrial position and wanted to qualify his remarks. About fifteen percent of the comments were directed toward suggestions for improving the video tape: "Difficult to hear," "Is it possible to see student faces when answering," "I wish I could tell how many students were in the classroom and actually participated in the discussion." The debriefing session conducted for all participants after the evaluation tasks were completed generally supported the items noted by an individual alone.

From these data it seems reasonable to conclude that the participants did note the same types of classroom behaviors observed by science education supervisors. For at least one individual, appearance and background noise were strong detractors away from teaching performance. Others noted the distractors but were not greatly influenced by them since most of the comments were generally favorable to the candidate.

Recapitulation

Addition of objective material and video taped teaching sequences to educational placement credentials has met an enthusiastic response. The evaluative study described in this section has shown that the added items, specially the video taped teaching sequences, are useful in selecting science teachers, and when included with the written credential materials, gives potential employers more confidence in their selection. From the data it would appear that potential employers are also concerned with teacher and student classroom behaviors when viewing the video taped teaching sequences. No judgment concerning the items' ability to better represent actual teaching performance can be made until a more controlled study is completed. From the evidence presented, the addition of these new items to educational placement credentials would be welcomed.

Additional Considerations

The evaluation of a placement credential which represents a candidate's teaching ability is far more than obtaining quantitative data on which to base a feasibility decision. Economic, legal and ethical issues need to be discussed and resolved. Since the video tape of teaching performance is the most costly addition to the credential package, and also is the most valuabl in decision making, an analysis of ethical, economic and legal problems is needed. Space does not permit this analysis here (See Nelson (1974) for the analysis). Based on the analysis the following is recommended.

It is the writer's position that the video tape portion of the placement credential be produced in the following manner. The candidate must voluntarily request to have a video taped placement credential made. Having taken the initial step, the candidate is given a choice of days when the video recording equipment will be available and told to prepare a unrehearsed, 20 to 25 minute minilesson complete with objectives, begin and end within the time limit, and that a variety of teaching situations should be illustrated during that time. These teaching situations could be lectures, discussions, laboratory, etc. On the appointed day, the lesson is taught to a class chosen by the candidate. Prior to recording the minilesson, a visual is recorded which identifies the candidate; date and place of graduation; teaching major and minor; location of the practicum experience; and thatthe lesson was unrehearsed. The minilesson is recorded immediately following the introductory visual. After the lesson is recorded in its entirety, the candidate views the video tape. If the candidate approves the video taped credential, he signs a paper, accompanying the video tape, which describes the lesson's objectives and states that the video tape was made voluntarily. The candidates signature would also authorize the placement bureau to release it to prospective employers. If the candidate disapproves of the video taped credential, he would have one more opportunity to produce one to his satisfaction.

The video taped credential would be owned and distributed by the placement bureau. A note would be placed in the paper portion of the credential indicating to a prospective employer that the candidate had made a video taped credential and that it was available from the placement bureau. Each video taped credential would be held and distributed for one year. After this time, the video tape would be erased and used again for another candidate.

Following this procedure would eliminate questions of ethics due to judicious editing. A reduction in production time of two thirds would result and subsequently reduce the cost of production. Having the video tape made voluntarily and having the candidate sign a release form eliminates many legal issues. In some states where laws of privacy have been enacted it may be necessary to obtain a written release from each student appearing in the class taught by the candidate. Consultation with a lawyer would reveal a course of action.

The implementation of these recommendations would add a new dimension to the selection of teachers. In an area of great subjectivity, more objective information about teaching performance is needed. This research has shown several ways of adding objectivity to the selection data. In addition to providing a letter of reference in the placement credential, a pictograph, competency list and video sample of teaching performance give employers more insight into the classroom performance of prospective employees. All of the additions have been found to be useful, but the single most useful item appears to be the sample of teaching recorded on a video tape. It is the writer's hope that employers will be able to say "What you see is what you get", when utilizing these new dimensions in educational placement credentials.

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APPENDIX

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File No. 73-1177

EVALUATION OF PROFESSIONAL COMPETENCIES FOR Thomas Charles Chartraw
name of candidate

Name of Write Miles A. Nelson Signature of Writer

Title Assistant Professor, Science Education Phone 608-263-4637 Date 6/5/73

School or Business University of Wisconsin Address 225 N. Mills Street
Madison, Wisconsin 53706

Tome has been a student in my methods course and under my direct supervision when he taught in a urban Wisconsin high school. His teaching assignment involved chemistry and physical science. The comments made below are based on my observations of his teaching and working with him in the methods course.

MASTERY
Tom has an adequate knowledge of subject matter. He is able to present material in a related manner and does use a variety of resources and experiences in class presentations.

PLANNING
This quite possibly is Tom's strength. He plans well and classroom routines are handled efficiently and with some insight. His long range plans include a variety of objectives, activities, and evaluation measures.

TEACHING
Tom is able to present material in a sequence relative to the subject matter. He moves nicely from one part of the lesson to the next as students are ready for it. His questioning techniques are quite well developed, and they attempt to keep students mentally active during the lesson. Tom uses a variety of visual aids when appropriate. His one weakness may be that chemistry is a difficult subject and that students should have a difficult time in learning it.

CLIMATE
As far as administrative procedures go, he is quite well organized and handles these quite efficiently. He generally uses good judgment in coping with unexpected behavior, and he formulates simple but adequate clear rules for students to follow. He sometimes remains aloof from the students, but I have seen considerable improvement in this area.

EVALUATION
He constructs tests of reasonable length and difficulty. He does use a variety of procedures. He is able to identify strengths and weaknesses in his own teaching.

PERSONAL CHARACTERISTICS
Tom has energy and zest in his teaching. He has gained considerable confidence in himself as a result of his student teaching experience. And he is willing to accept advice and suggestions of those in authority.

RECOMMENDATION
Tom has done an unusually good job. With a little more opportunity for professional growth, he is almost certain to become an outstanding teacher.

SCHOOL OF EDUCATION
UNIVERSITY OF WISCONSIN-MADISON

FILE NO. 73-1177

OBJECTIVES FOR SCIENCE METHODS COURSE AND PRACTICE TEACHING

Objectives Achieved by: Tom Chartraw Evaluated by: Dr. Miles A. Nelson
James Sime

Location of Student Teaching/Intership: East High School, Madison

During the methods course and practice teaching, science teacher candidates at UW-Madison concentrate on fulfilling objectives selected from this list. Since time is limited, no one is expected to complete all of them. Proficiency must be demonstrated before a rating is assigned. *Denotes objectives which are required of all students. A check in the (NR) column indicates no rating can be assigned because the objective is primarily designed for practice. All other objectives will be assigned ratings.

The following rating scale is used for each objective:
1. Achieved with unusual insight and some creativity
2. Achieved with some insight
3. Achieved mechanically

SCIENCE AND CHILDREN

Methods (1)	Methods (2)	Methods (3)	Methods (NR)	Practicum (1)	Practicum (2)	Practicum (3)	Practicum (NR)	Objectives
			(x)					1. Reasons why science should be taught.
( )	( )	( )						2. Science processes:
( )	( )	( )		( )	( )	( )		a) Knowledge of
( )	( )	( )		( )	( )	( )		b) Design of a research project
								c) Critique student research projects
			*(X)					3. Cognitive Development:
			( )				( )	a) Knowledge of
( )	( )	( )						b) Determine of child's level of
								4. Characteristics of Discovery Learning

PLANNING

Methods (1)	Methods (2)	Methods (3)	Methods (NR)	Practicum (1)	Practicum (2)	Practicum (3)	Practicum (NR)	Objectives
			*(X)					1. Instructional Objectives:
			*(X)					a) Identify
*( )	(X)	( )						b) Write
*( )	(X)	( )						c) Write for a chapter in a text
								d) Write activities for objectives
*(X)	( )	( )		( )	( )	( )		2. Unit Plan:
				( )	( )	( )		a) Construct
								b) Implement
*( )	(X)	( )						3. Lesson Plans:
				(X)	( )	( )		a) Write
								b) Write for the practicum
( )	( )	( )						4. Resourcefulness:
				( )	( )	( )		a) Prepare a resource file
								b) Utilize resources available in planning lessons

ERIC

Name Thomas Chartraw FILE NO. 73-1177

OBJECTIVES FOR SCIENCE METHODS COURSE AND PRACTICE TEACHING

TEACHING TACTICS

Methods				Practicum				Objectives
(1)	(2)	(3)	(NR)	(1)	(2)	(3)	(NR)	
( )	( )	( )		(X)	( )	( )		1. Lecture:
				*(X)	( )	( )		a) Construct lesson plan for
								b) Successful classroom performance of
( )	( )	( )		(X)	( )	( )		2. Recitation:
				(X)	( )	( )		a) Construct lesson plan involving
								b) Successful classroom performance of
( )	( )	( )		( )	(X)	( )		3. Probing Discussion:
				*( )	(X)	( )		a) Construct lesson plan for
								b) Successful classroom performance of
								4. Laboratory activities:
								A. Type 1 - Practice of a psychomotor skill:
( )	( )	( )		( )	(X)	( )		a) Construct lesson plan for
				( )	(X)	( )		b) Successful classroom performance
								B. Type 2 - Student verification of a known concept:
( )	( )	( )		(X)	( )	( )		a) Construct lesson plan for
				*(X)	( )	( )		b) Successful classroom performance
								C. Type 3 - Student discovery of concept
( )	( )	( )		(X)	( )	( )		a) Construct lesson plan for
				*(X)	( )	( )		b) Successful classroom performance
								D. Type 4 - Practice techniques of investigating a problem:
( )	( )	( )		( )	( )	( )		a) Construct lesson plan for
				( )	( )	( )		b) Successful classroom performance
								E. Type 5 - Student selected problem of study - research:
( )	( )	( )		( )	( )	( )		a) Construct lesson plan for
				( )	( )	( )		b) Successful classroom performance
( )	( )	( )		(X)	( )	( )		5. Demonstration Technique:
				(X)	( )	( )		a) Construct lesson plan for
								b) Successful classroom performance of
( )	( )	( )		( )	( )	( )		6. Field Trips:
				( )	( )	( )		a) Construct lesson plan for
								b) Successful classroom performance of
( )	( )	( )		( )	(X)	( )		7. Invitations to Inquiry:
				( )	(X)	( )		a) Construct lesson plan for
								b) Successful classroom performance of
( )	( )	( )		(X)	( )	( )		8. Science and Society Discussion:
				(X)	( )	( )		a) Construct lesson plan for
								b) Successful classroom performance of
*( )	(X)	( )						9. Audio-Visual Devices:
( )	( )	( )						a) Demonstrates how to use
				( )	(X)	( )		b) Construct lesson plan using
				( )	(X)	( )		c) Successful classroom performance of
								10. Problem Solving:
( )	( )	( )		(X)	( )	( )		a) Construct lesson plan using
				(X)	( )	( )		b) Successful classroom performance of

Name Thomas Chartraw FILE NO. 73-1177

OBJECTIVES FOR SCIENCE METHODS COURSE AND PRACTICE TEACHING

TEACHING SKILLS

Methods				Practicum				Objectives
(1)	(2)	(3)	(NR)	(1)	(2)	(3)	(NR)	
*(X)	( )	( )		(X)	( )	( )		1. Beginning a Lesson
*( )	(X)	( )		(X)	( )	( )		2. Verbal Reinforcement
*( )	(X)	( )		( )	(X)	( )		3. Conclusion of Lesson
			( )	( )	(X)	( )		4. Discipline
				( )	(X)	( )		5. Classroom Management
							( )	6. Extracurricular
( )	( )	( )		(X)	( )	( )		7. Tutoring

EVALUATION

Methods				Practicum				Objectives
(1)	(2)	(3)	(NR)	(1)	(2)	(3)	(NR)	
								1. Student Evaluation:
*(X)	( )	( )		(X)	( )	( )		a) Construction an evaluation device
( )	( )	( )		( )	(X)	( )		b) Compute test score characteristics
( )	( )	( )		( )	( )	( )		c) Develop criteria for assessing a research report
								2. Self-Evaluation of Teaching:
*( )	( )	( )						a) Video tape analysis
*(X)	( )	( )						b) Construct a model of a good teacher
(X)	( )	( )		(X)	( )	( )		c) Construction a data-gathering instrument for self-evaluation
				*( )	(X)	( )		d) Verbal interaction patterns
				(X)	( )	( )		e) Instructional patterns
							*(X)	f) Student evaluation of teaching
								3. Curriculum Evaluation:
(X)	( )	( )		(X)	( )	( )		a) Textbook analysis
( )	( )	( )		( )	(X)	( )		b) National Curriculum Comparison

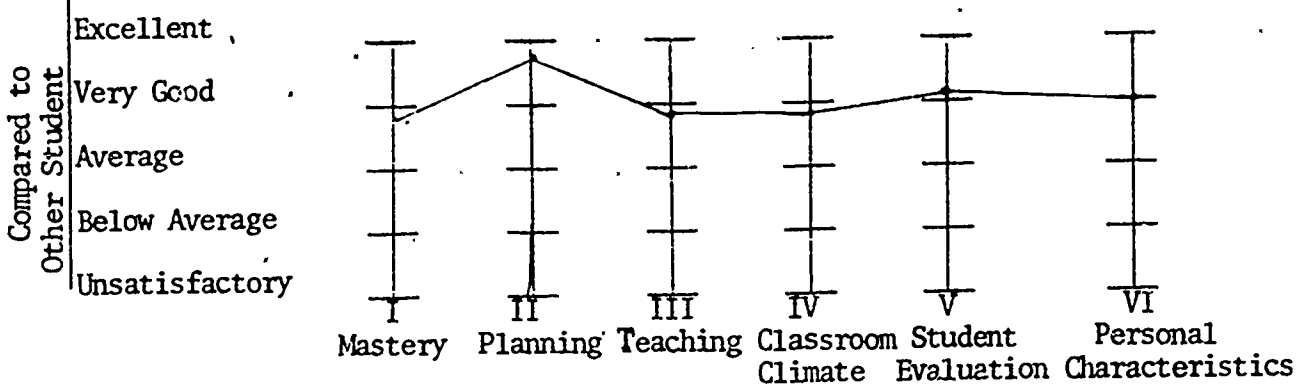
Name _____ FILE NO. 73-1177

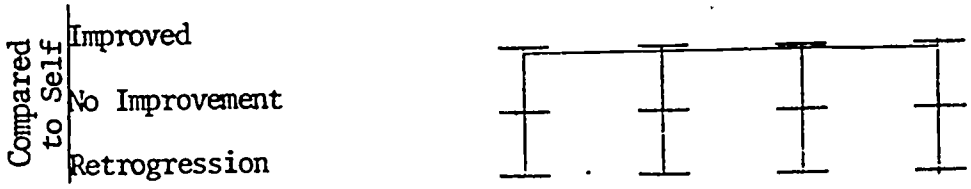
OVERALL COMPARATIVE PERFORMANCE - STUDENT TEACHING/INTERNSHIP

The following graphs summarize the strengths and weaknesses of the candidates as noted by the cooperating teacher and methods professor during the practicum. The categories are explained in Dr. Nelson's letter of recommendation.

EVALUATION BY DR. MILES A. NELSON

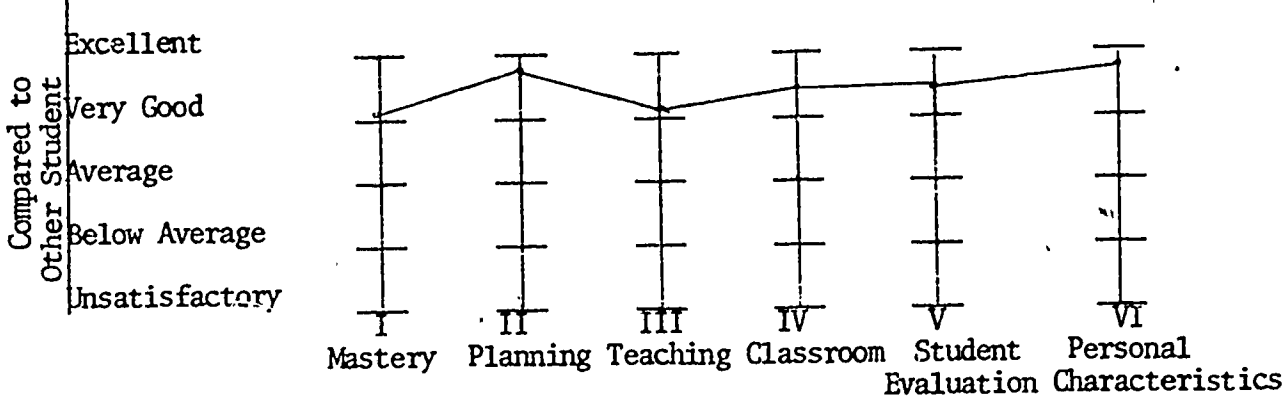
Total number of student teachers/ interns observed 300.

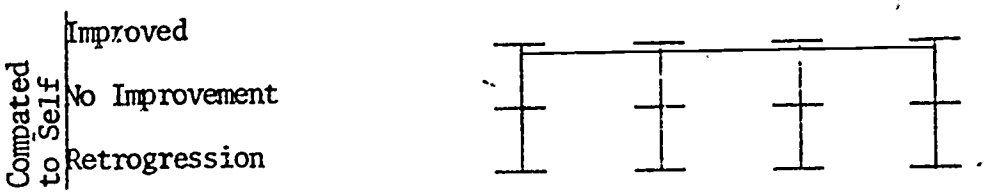




Evaluation by James Sime

Total number of student teachers/interns observed 4 .





Name Thomas Chartraw File No. 73-1177

Date May 1973

THERE IS AVAILABLE FOR THIS INDIVIDUAL A SHORT (15-20 MINUTE) VIDEO TAPE OF SELECTED TEACHING SEQUENCES TAKEN DURING THE CANDIDATE'S FIELD EXPERIENCE. THIS TAPE WILL BE HELD FOR THE CANDIDATE'S USE FOR ONE YEAR AFTER THE DATE ABOVE. THE VIDEO TAPES CAN BE MADE AVAILABLE TO PLAY ON MOST PLAYBACK EQUIPMENT MANUFACTURED AFTER 1970. IF YOU WISH TO VIEW THE TAPE EITHER AT YOUR SCHOOL AND WITH YOUR EQUIPMENT, OR AT THE UNIVERSITY OF WISCONSIN-MADISON, WRITE TO:

Dr. Miles A. Nelson
Teacher Education Building
225 North Mills Street
Madison, Wisconsin 53706

Directions: Suppose that you have a chemistry position to fill in your school. Assume a candidate with an M.S. degree will be paid the same as a candidate with a B.S. degree. The candidates listed below have applied for the position. Your task is to determine which candidate is most desirable, the next most desirable, and so forth. Use only the information supplied in order to make your decision. Place a 1 after the name of the candidate most desirable, a 2 after the next most desirable and so on until you have ranked all four applicants. When you have completed this task, answer the questions below.

Thomas Chartraw _____
Katherine Haller _____
Thomas Kihslinger _____
Mark Whittier _____

Questions to be answered after completing the above ranking:

1. Rank the following with respect to usefulness to you in evaluating a candidate for employment. Use a 1 for the most useful; a 2 for the next and so on.

_____ Candidates personal data
_____ Grade Report
_____ Letter of recommendation from cooperating teacher
_____ Letter of recommendation from methods professor
_____ Letter of recommendation from university supervisor
_____ Video tape of a lecture
_____ Video tape of a laboratory session
_____ Video tape of a laboratory session

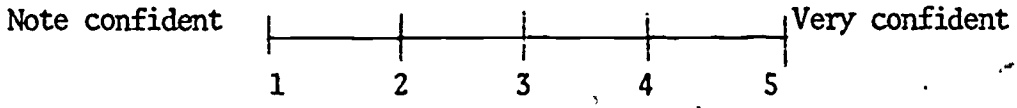
2. Was there any information in the credentials you evaluated that was particularly helpful to you in arriving at a decision concerning the candidates. Yes ____ No _____
If yes, what was this information _____

_____

If no, what information would you prefer to have _____

_____

3. Did you skip portions of the video tapes? Yes ____ No____
If yes, what was your reason for doing so _____

_____

4. How would you rate your confidence in the decisions made above based upon the information provided.